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B

CONTAGIOUS DISEASES IN POLAND AND THE BATTLE AGAINST THEM

[Following is a translation of a Polish-language article by Danuta Naruszewicz-Lesiuk and Romuald Tworek (deceased), from Choroby Zakaźne w Polsce i Ich Zwalczanie w Latach 1919-1962 (Contagious Diseases in Poland and the Battle Against Them - A Joint Contribution Under the Editorialship of Professor Doctor Jan Kostrzewski) Panstwowy Zaklad Wydawnictw Lekarskich (State Institute of Medicine Publications), Warsaw, 1964.]

ANTHRAX

Anthrax is a dangerous contagious disease of animals which sometimes is transferred onto humans. The etiological factor is the bacillus anthracis, an aerobic bacterium which infects. The victims of anthrax are mostly herbivorous animals, as cattle, sheep, horses, goats, camels, and game. This disease may also occur in dogs, domestic cats, and wild carnivorous animals. Domestic animals are infected with anthrax above all by means of contaminated grazing land, fodder, and water, and the source of infection is always a sick or dead animal. A certain role in the propagating of this disease amongst animals and transferring the infection onto humans may play insects which suck blood.

The diseased animals usually lose blood, which may occur violently within a short period of time or last a few days. Some animals, as pigs, usually take longer. Mortality is very high, and according to the animal species, may vary from 75 to 100% (12). The clinical aspect of anthrax in animals is usually nonspecific and the diagnosis may be made on the basis of dissection, bacteriological investigation, serological investigation (Ascoli reaction) and biological tests on laboratory animals (white mouse, guinea pig, rabbit).

The anthrax in humans is a typical disease which they contract from animals, and the transfer of the disease from human to human is a rarity (6). Man may become infected by means of direct contact with a sick or dead animal and by coming into contact with its tissue, skin, hair, bristle, fur, horns, bones, or excrementa.

Depending on the circumstances in which the contamination took place, the anthrax of humans may be divided into industrial cases (factory processing of skins or wool - the disease of wool sorters), agricultural type (growers, zootechnicians, veterinarians, farmers), and sickness which is not associated with any particular profession. Most of them the infection enters via damaged skin (scrapings, scratchings, small wounds). Much more so than the contamination occurs via the respiratory tracts or the gastric tract. Depending on the entrance of the bacillus, the disease may assume a skin, lung, or duodenum form. The gestation period of the disease is 1 to 3 days (from a few hours to 10 days). The death is always preceded by shedding of blood.

The skin form of anthrax in humans, the so-called black scab (postula maligna) may be diagnosed after a clinical observation. After 2 to 3 days of gestation, on the reddened skin we see a small red blister. After 1 to 2 days the center of the excrescence becomes intensively colored, increases in size rapidly and becomes black. Around the scab forms a hard swelling, which is not very painful, but sensitive to touch. In this period general symptoms manifest themselves as fever and weakening, whose intensity is associated with the magnitude of primary changes on the skin. The disease may then extend through lymphatic and blood carrying vessels, resulting sometimes in blood shedding which often results in death. It is more difficult to diagnose the malignant anthrax swelling or the secondary skin form. It is most difficult to diagnose the duodenum and lung forms. In those cases in order to diagnose this disease it is necessary to carry out an epidemiological investigation, test bacteriologically the sputum, excrementum and vomitings (bacterioscopic and culture tests), and occasionally by biological tests on animals.

AN APPRAISAL OF THE EPIDEMIOLOGICAL SITUATION IN THE WORLD

From a historical point of view anthrax occupies a special place in the epidemiology and epizootiology as a first disease in which the bacterium etiological factor was discovered. From the anthrax bacillus cultures was prepared the first in the world effective bacterial vaccine for animals. The investigations conducted with the bacillus of anthrax formed the basis of modern bacteriology and prophylactics (Pasteur, Koch).

Anthrax was described in antiquity and in the middle ages, where it caused large epidemics. In 1769 Fournier for the first time described exactly the diseases in human and animals and Bathelemy (1823) established the contagious character of the disease.

Anthrax is a popular disease in the world. Its distribution is, however, difficult to establish, as some countries do not publish data on it. In humans, according to the calculations of Glassman, the occurrence is 20,000 to 100,000 cases yearly (3). Large number of occurrences are reported in Africa (Kenya), South America (Argentina, Chile), Europe and the Near and Middle East (Turkey, Iraq). In Europe the largest number of occurrences is

in the Pyrenees Peninsula (Portugal, Spain), and the Appenine Peninsula (Italy) and the Balkan Peninsula (Yugoslavia, Greece); (table 1), and the highest occurrence of this disease is in Bulgaria, Rumania, Yugoslavia and Italy.

TABLE 1

Anthrax in humans according to countries.
Diseases in the period 1951-1961

Country	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Kenya	1 000	801	620	1 167	587	1 008	[illegible]	[illegible]	689	.	.
Tanganika	.	.	.	469	605	803	[illegible]	[illegible]	[illegible]	.	.
USA	60	47	45	22	39	36	26	16	12	23	9
Mexico	172	114	205	152	142	111	[illegible]	[illegible]	.	.	.
Argentina	153	460	393	319	191	244	211	137	[illegible]	244	.
Chile	.	.	.	315	401	232	394	471	241	269	127
Japan	2	—	3	3	6	1	—	3	5	3	2
Turkey	1 239	1 668	1 756	1 654	1 363	1 479	1 512	1 157	1 069	958	.
Portugal	1 697	1 280	1 171	1 078	1 002	701	430	403	222	141a	91a
Spain	.	.	.	1 132	663	692	737	798	632	603a	502a
Italy	1 058	1 364	934	679	552	534	469	472	313	313a	.
Austria	1	—	—	10	3	7	15	10	3	1a	5
Hungary	.	.	.	16	39	30	46	52	32a	19a	35a
Yugoslavia	1 023	1 337	954	767	477	480	341	397a	292	213	262a
Poland	12	12	14	13	7	11	13	4	8	10	9

a- approximate data
Source: Rapport Epidemiologique et Demographique 1958, 11, 9, 476; 1960, 13 11/12, 578.

The highest number of deaths in Europe are reported by Italy, Portugal, and Spain.

As is seen from the statistical data, not only the number of occurrences, but also the number of deaths in Europe have a strong tendency to fall.

ANIMAL AND HUMAN ANTHRAX IN POLAND

The highest intensity of anthrax amongst domestic animals in Poland was between the years 1922-1939 (table 2), which caused large losses of the stock.

The prophylactic action in areas exposed to the disease was simultaneously to vaccinate and apply the serum and in the remaining areas only to vaccinate. However, satisfactory results were not obtained, as may be seen from the data of contaminated farms in the years 1923-1927. Statistical data for the period 1928-1939, however incomplete and too low, nevertheless sho[illegible]

that anthrax also during that period was an epidemic problem. An appreciable fall of the number of contaminated farms is observed from the year 1950 onwards. This is probably due to the introduction of a very effective vaccine and a mass vaccination.

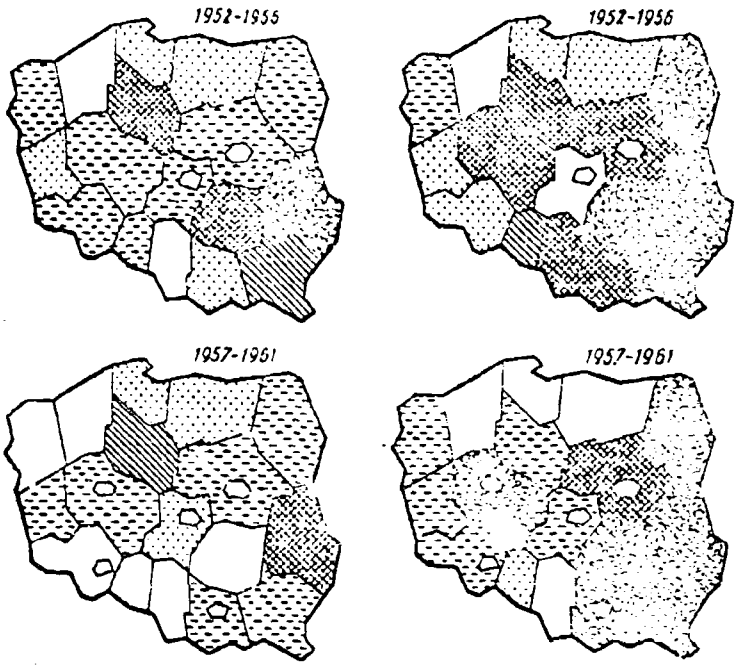
TABLE 2

Animal anthrax in Poland in the period 1922-1961

Year	Contaminated farms	Sick and suspected animals	Prophylactic and curing vaccines	Year	Contaminated farms	Sick and suspected animals	Prophylactic and curing vaccines
1922	659	867	3 171	1947	60	569	97
1923	562	17 755	7 447	1948	107	993	5 273
1924	916	12 247	5 359	1949	140	1 344	5 408
1925	944	19 201	10 118	1950	64	717	11 456
1926	881	19 850	14 755	1951	73	558	14 888
1927	1 000	21 928	21 567	1952	71	992	15 443
1928	896	.	.	1953	54	906	13 026
1929	1 022	.	.	1954	65	78	18 472
1930	561	.	.	1955	44	51	20 493
1931	500	.	.	1956	51	143	17 473
1932	867	.	.	1957	36	61	18 420
1933	344	.	.	1958	48	.	15 941
1934	.	.	.	1959	33	.	17 496
1935	353	.	.	1960	26	.	19 538
1936	422	.	.	1961	26	.	19 006
1937	516	.	.				
1938	334	.	.				
1939	106	.	.				

Source: J. Herman: Fighting Contagious Animal Diseases in Poland (1922-1927). 1922 data are incomplete; Wiadomosci Weterynaryjne (Veterinary News), 1928-1939; Medycyna Weterynaryjna (Veterinary Medicine) Year 10, No 7, Year 15, No 7 (1947-1957); The Ministry of Agriculture.

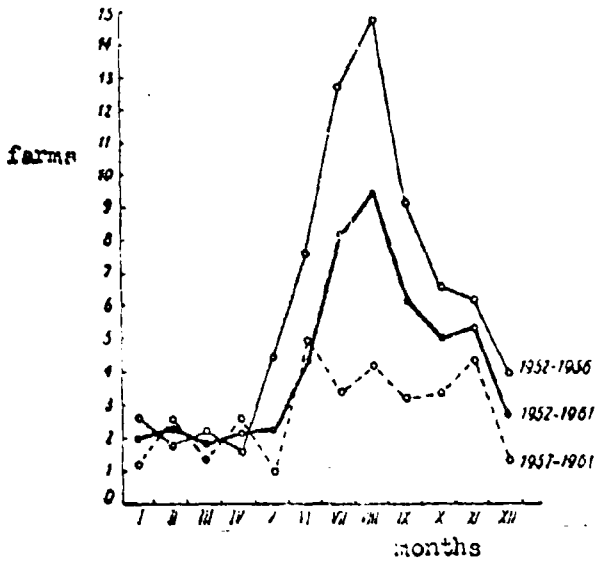
The media spreading diseases in our ~~country~~ are pastures which have been anthrax infected and dead animals. A new phenomenon of recent years is the spreading of the disease among animals kept for their fur, like minks and foxes which are fed contaminated dead animals or meat from slaughtered sick animals. The largest number of cases is reported in the eastern part of the country (~~drawing 1~~) and occurs mainly during the summer months (~~drawing 2~~).



vojevodshaft not reported in this period
vojevodshaft reported for one year
vojevodshaft reported for two years
vojevodshaft reported for three years
vojevodshaft reported for four years
vojevodshaft reported every year

Drawing 1. Anthrax in humans (two left side graphs) and in animals (two right side graphs) in Poland according to vojevodshafts in the years 1952-1961.

The registration of humans who had anthrax was begun in Poland in 1919. Because of diagnostic difficulties and because of a small number of cases relative to other diseases, and therefore only a superficial concern with this disease, the available information does not reflect probably the actual state of affairs.



Drawing 2. Graph of contaminated farms in the period 1952-1956, 1957-1961, and 1952-1961 by months (monthly average).

Anthrax in humans in Poland occurs sporadically singly or in small epidemics which almost always could be related to cattle centers. The annual number of cases was relatively low. Between the years 1919 and 1937, the largest number of cases (81) was reported in 1928 (table 3).

After WW II the number of cases decreased sharply and from 1945 onwards did not exceed 20 cases yearly, with the exception of 1948 when there were 33 cases. This figure corresponds to an incidence of 0.1-0.3 per 100,000 population per year during the prewar period and 0.02-0.08 per 100,000 people per year during the postwar period, with the exception of 1948 when the incidence was 0.14 per year.

The number of deaths due to anthrax before the Second World War was fairly high at above 10% and in 1933 it was 32%. Since 1946 the number of deaths decreased. Between 1946 and 1955 six deaths were reported and since 1956 there were no anthrax due deaths in Poland.

TABLE 3

Occurrence of anthrax in humans in Poland between the years 1919-1937 and 1946-1961

Year	Cases	Deaths	Incidence per 100,000 population
1919	6	1	0,02
1920	37	10	0,14
1921	66	16	0,24
1922	56	10	0,21
1923	58	11	0,21
1924	69	17	0,26
1925	75	11	0,28
1926	58	10	0,21
1927	62	10	0,23
1928	81	11	0,30
1929	58	7	0,21
1930	59	8	0,22
1931	71	9	0,22
1932	76	12	0,24
1933	31	10	0,10
1934	50	5	0,16
1935	51	7	0,16
1936	50	10	0,16
1937	69	7	0,22
1946	10	1	0,04
1947	10	1	0,04
1948	33	1	0,14
1949	19	1	0,08
1950	15	—	0,06
1951	12	—	0,05
1952	12	1	0,05
1953	14	—	0,05
1954	13	—	0,05
1955	7	1	0,02
1956	11	—	0,04
1957	13	—	0,01
1958	4	—	0,01
1959	8	—	0,02
1960	10	—	0,03
1961	9	—	0,02
1962	4	—	0,01

Source: Kroniki Epidemiologiczne, Ministerstwo Zdrowia i Opieki Społecznej (Edipemiology Reports, Ministry of Health and Social Welfare).

Between the years 1925 and 1937 the highest incidence of anthrax was reported in the following vojevodshafts: Lwow, Stanislawow, Wolyn, and Bialystok (table 4). Here we should emphasize that the incidences of anthrax occur in these vojevodshafts every year. The least number of incidences was observed in the following vojevodshafts: Slask, Posnan, Lodz, and Pomorze. Since 1946 the disease persists in the Lublin vojevodshaft (table 5), where it occurs in humans (except 1958) and where during the last 15 years there were 32 cases. Moreover, a large number of diseases was reported in the following vojevodshafts: Rzeszow - 30 cases during the last 15 years, Wroclaw - 16 cases, Poznan - 15 cases, Kielce - 13 cases. During the last 15 years (1946-1960) no anthrax cases were observed in the city of Warsaw and in the Koszalin vojevodshaft and in the 10 year period to to 1960 no anthrax cases were observed in the Katowice vojevodshaft and in the city of Lodz.

The distribution of human anthrax cases in Poland does not coincide strictly with the distribution of occurrence of this disease among domestic animals (drawing 1). For example, between 1952 and 1956 in the Lodz vojevodshaft there were no occurrences of animal anthrax, but there were occurrences of human anthrax. A similar situation was observed between 1957 and 1961 in the Gdansk and Olsztyn vojevodshafts.

PREVENTION AND ELIMINATION OF ANTHRAX

The prevention campaign among humans consists essentially of combatting the disease among animals. The main weapon of the prophylactic action is the destruction of contamination sources and protective vaccinations.

The destruction of contamination sources consists mainly of burying of cadavers of animals which died of anthrax (or were suspected to have it) in burial grounds or of giving up the cadavers to sanitary institutes. Because of the biological properties of the anthrax bacillus, the contamination sources have to be thoroughly disinfected. The vegetative form of the anthrax bacillus is sensitive to disinfecting media and it is easy to destroy it. However, the live anthrax bacilli are very resistant and in order to destroy them they have to be exposed to the disinfecting medium for a long time. Boiling kills the bacilli after about 10 minutes (14). The bacilli withstand multiple freezing and defreezing. A 5% cresol solution is effective after 7 hours, a 5% phenol solution acts after 2 days, a 10% solution of mercury chloride acts after 20 minutes. The most effective disinfecting medium is a 5% sodium hydroxide solution (6). Such high resistance of active anthrax bacilli enables them to survive many years and cause subsequent infecting.

TABLE 1.

Human anthrax in Poland. Incidence in vojevodshafts in the period 1925-1937

Vojevodshaft	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
Warszawa (town)	1	2	3	—	4	—	—	1	--	--	--	--	2
Warszawa	5	--	2	1	1	2	1	17	—	—	2	—	--
Lodz	3	4	5	4	1	2	--	1	—	2	--	--	2
Kielce	5	2	4	4	4	9	12	10	1	--	4	5	1
Lublin	2	2	4	11	8	7	3	9	5	7	1	--	3
Bialystok	5	3	8	8	8	8	11	8	2	5	5	1	4
Wilno	3	--	1	2	6	2	4	4	1	4	3	5	13
Nowogrodek	--	2	1	--	--	--	7	2	--	3	--	1	5
Polesie	6	--	2	4	--	1	6	--	--	1	5	--	--
Wolyn	8	5	2	6	8	7	6	5	6	3	5	27	3
Poznan	4	2	3	--	2	—	1	1	--	2	1	--	4
Pomerze	4	7	2	--	1	--	--	1	--	3	5	1	--
Slask	--	--	--	3	--	--	1	--	--	--	1	1	--
Krakow	4	6	—	1	--	3	1	2	4	3	10	—	15
Lwow	14	17	17	22	10	10	12	12	5	10	5	7	9
Stanislawow	2	2	1	9	4	4	3	3	5	2	3	2	1
Tarnopol	2	4	5	3	1	4	3	--	2	5	1	--	7
Total	75	58	69	81	58	59	71	76	31	59	51	50	69

Source: Kronika Epidemiologiczna (Epidemiological News).

TABLE 5

Human anthrax in Poland. Incidence in vojevodshafts in the period 1946-1962

Vojevodshaft	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
Warszawa (town)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Warszawa	1	—	—	—	—	5	—	—	2	1	—	—	—	3	1	—	—
Bydgoszcz	—	—	—	—	—	—	1	2	4	1	—	2	1	—	—	3	—
Poznan	3	—	8	2	—	—	1	4	—	—	—	—	1	—	1	—	—
Lodz (town)	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Lodz	4	—	—	—	—	—	1	—	—	—	1	—	—	1	—	—	—
Kielce	—	—	—	1	5	—	3	1	2	1	—	—	—	—	—	—	—
Lublin	—	4	3	1	1	2	2	3	3	1	4	3	—	2	3	6	2
Bialystok	—	—	4	—	—	1	—	1	—	—	1		—	2	3	—	—
Olsztyn	—	—	—	—	—	1	—	—	—	—	1	1	—	—	—	—	
Gdansk	—	—	1	2	—	—	—	—	—	—	1	1	—	—	—		1
Koszalin	×	×	×	×	×	—	—	—	—	—	—	—	—	—	—		
Szczecin	—	—	—	2	—	—	2	—	—	1	—	—	—	—	—	—	
Zielona Gora	×	×	×	×	×	—	—	1	—	—	2	—	1	1	1		
Wroclaw	—	—	2	9	1	1	2	—	1	—	—	—	—	—	—	—	—
Opole	×	×	×	×	×	—	—	1	—	—	—	—	—	—	—	—	
Katowice	1	—	—	1	3	—	—	—	—	—	—	—	—	—			
Krakow	—	1	3		2	—	—	1	—	—	—	3	1	—			
Rzeszow	1	5	12		3	2	—	—	1	2	1	2		—	1	—	1
Total	10	10	33	19	15	12	12	14	13	7	11	12	4	8	10	9	4

Source: Ministerstwo Zdrowia i Opieki Spolecznej (Ministry of Health and Social Welfare).

When the disease has been diagnosed, it is imperative to remove the cadavers as quickly as possible, to disinfect the immediate environment, and to vaccinate the animals which are alive (4). When anthrax has been diagnosed, the veterinarian should notify the health service authorities, because of the nature of the disease, only an intimate collaboration of the veterinary service and the health service may effectively counteract the disease. Animal anthrax is regarded to be extinct if, after the environment has been disinfected, all the animals in the contaminated farm either died or were removed and if during the next 14 days after the removal or recovery of sick or suspected to be sick animals, no new cases or suspected cases of this disease have occurred (2).

The protection of humans against the disease consists of control of raw materials of animal origin (skins, bristle, hair) and when a suspicion of contracting the disease exists, then these raw materials have to be disinfected thoroughly. The method of disinfecting of contaminated raw material depends on its nature. To disinfect the skins, as a rule, we use the method of Schatenfook (10). This method consists of soaking the skins in a mixture of a 1-2% solution of hydrochloric acid together with a 10% solution of common salt. The Liverpool method is used for the decontamination of bristle, wool, and hair. This method utilizes the rinsing of the raw material in an alkaline salt solution at a temperature between 39 and 43°C and subsequently in a 2.3% solution of formaldehyde at a temperature between 39 and 41°C and a subsequent storage in the storage for a few days (6).

To fight successfully anthrax in humans it is necessary to set a rapid and correct diagnosis and to cure the disease properly. The medicines which may be employed are antibiotics (penicillin, auromycin, chloromycetyn, terramycin), sulfanamides, and in acute cases, using antibiotics together with a resistant antianthrax serum (6).

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